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Multivariate Prediction of Posttraumatic Symptoms in Psychiatric Inpatients

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Based on a conceptual framework for the long-term effects of childhood abuse, this study examined the capacity of childhood family environment (caretaker dysfunction, neglect, perceived social support), violent abuse (physical and sexual), and individual variables (other abuse) to predict adult psychiatric symptoms of PTSD, dissociation, and depression. Complete interview data were obtained from 178 psychiatric inpatients who varied greatly on abuse status and severity. Results of multiple regressions of predictor variables onto the three outcome variables showed that the predictor variables accounted for 15% (for depression) to 42% (for PTSD) of the variance in these symptoms and that violent abuse uniquely accounted for a significant proportion of the variance in outcomes for all three of the symptom groups studied.

KEY WORDS: trauma; PTSD; abuse; multiple regression.

Although a wide variety of life experiences contribute to adult psychological difficulties, childhood experiences of abuse appear to have particularly powerful and long-lasting effects for some individuals (Berliner & Elliott, 1996; Kolko, 1996). A major difficulty in conceptualizing the effects of child abuse is that there

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is great variation in the nature and severity of abuse and in its effects. As we have proposed elsewhere (Carlson, Furby, Armstrong, & Shlaes, 1997), violent instances of child abuse are hypothesized to be more likely to create overwhelming fear and thereby increased risk for the development of posttraumatic stress symptoms. The question of whether a trauma model based on classic fear theories applies well to child sexual abuse (CSA) has been a subject of debate among investigators for some time. Although we agree with Finkelhor (1988) that a trauma model fails to describe the impairment of all of those who experience CSA, we also agree with Rowan and Foy (1993) that a trauma model does appear to fit well for those who experience very violent sexual abuse such as incidents involving penetration. A trauma model also applies well to children who experience violent physical abuse such as acts likely to cause injury. Making this type of distinction between violent abuse and less extreme instances of physical or sexual maltreatment (such as slapping or fondling) is specifically recommended in a recent review of the nature, causes, and consequences of abusive family relationships (Emery & Laumann-Billings, 1998).

Researchers to date have not differentiated between violent and nonviolent abuse, but a number of empirical studies have found that victims of childhood abuse experiences have high levels of posttraumatic stress disorder (PTSD) and dissociation symptoms, which are considered characteristic of traumatization. Many studies of CSA and child physical abuse (CPA) experiences have found them to be associated with long-term posttraumatic symptoms (Briere, Woo, McRae, Foltz, & Sitzman, 1997; Neumann, Houskamp, Pollock, & Briere, 1996).

According to our conceptual framework for the impact of trauma (Carlson, 1997; Carlson & Dalenberg, 2000), a number of environmental, trauma, and individual characteristics are thought to influence responses to trauma. Environmental characteristics that influence responses include factors such as family environment and social support. Trauma characteristics include factors that might contribute to the severity of the stressor (such as intensity, nature, duration, and frequency). Individual characteristics that may be relevant include biological factors (such as temperament, genetic vulnerability or resilience, and physiological changes resulting from trauma), developmental level, and life events before and after the trauma.

This study was undertaken to investigate the capacity of a multivariate model to predict posttraumatic symptoms. We sought to determine the capacity of multiple environmental variables (neglect, caretaker dysfunction, and perceived social support), violent abuse variables (violent physical and violent sexual abuse), and individual variables (other physical and sexual abuse and other traumatic stressors) to predict adult psychiatric symptoms. We focused on violent abuse events (sexual assaults involving attempted or completed penetration and physical assaults likely to cause injury) because we believe that those events are most likely to cause the overwhelming fear that is thought to increase the risk of traumatization (Carlson & Dalenberg, 2000). Developmental level at the time of child abuse trauma was not

included as a predictor because data would not have been available for the entire sample because all participants did not experience child abuse trauma.

Some studies have investigated the relationships between posttraumatic responses and environmental characteristics similar to those we studied. Both parental mental illness and parental alcoholism have been found to be associated with elevated levels of anxiety and depression in adults (Parker & Harford, 1988; Williams & Corrigan, 1992). Dysfunctional behavior in caretakers has been found to be related to adult PTSD symptoms in a large sample of Vietnam veterans (King, King, & Foy, 1996) and to adult dissociation in psychiatric inpatients (Draijer & Langeland, 1999). To our knowledge, no studies have yet been conducted on the relationships between PTSD and childhood neglect or social support. In terms of trauma characteristics, some studies have found severity of both childhood sexual and physical abuse experiences to be associated with long-term posttraumatic symptoms (Rodriguez, Ryan, Rowan, & Foy, 1996; Rodriguez, Ryan, Vande Kemp, & Foy, 1997). Studies investigating the impact of life events subsequent to abuse have found that the effects of child abuse and later traumatic events appear to be cumulative (Dancu, Riggs, Hearst-Ikeda, Shoyer, & Foa, 1996; Follette, Polusny, Bechtle, & Naugle, 1996).

Psychiatric inpatients were chosen as the participants for this study because we believed the investigation would be most useful in a sample that showed a wide range of both abuse experiences and levels of symptomatology. Although inpatients have higher symptom levels compared to outpatients or general population samples, they also show a fairly wide range of severity on any particular psychiatric symptom. Maximizing the range for predictor and outcome variables increases the likelihood of detecting existing relationships among variables.

In this study, we conducted hierarchical regression analyses of the capacity of family environment characteristics (childhood neglect, caretaker dysfunction, and perceived social support), violent abuse (sexual abuse involving attempted or completed penetration and physical abuse likely to cause injury), other childhood abuse experiences, and other traumas to predict adult psychiatric symptoms. Predictor variables were entered in sets, based on their presumed chronological order and on a comprehensive conceptual framework for the long-term effects of childhood abuse (Carlson et al., 1997). Although we studied a wide range of outcome variables, we will limit our focus here to symptoms of PTSD, dissociation, and depression because these have been most frequently associated with the experience of traumatic events.

Method

Participants

Participants were inpatients in a large, private, nonprofit psychiatric hospital primarily serving urban and suburban areas. We sought to interview all newly

admitted patients during a $3\frac{1}{2}$-year period who were between the ages of 30 and 45 (in order to limit the length of the recall period for childhood experiences). During the study period, 2,468 patients in the specified age range were admitted and their therapists were contacted. We received replies to our contacts in regard to 1,013 of these patients rapidly enough to permit contact before the patient was discharged. Because the average length of stay for patients was only 7 days by the end of the first year of data collection, patients were often on the verge of discharge by the time their therapists received our request. Therapists receiving our requests may have failed to respond when they knew a patient would be leaving the hospital before he or she could have been interviewed, but we were not able to collect data on the reasons for therapist nonresponse. Of therapists who replied, permission was given in regard to interviewing 884 patients (87%) and permission was refused in regard to 129 patients (13%). Of the 884 patients we were given permission to approach, 293 were discharged before we could contact them. Of the 591 patients we did contact, 217 completed all or most of the interview, 180 declined to participate, and 194 were not interviewed because they were discharged, were not available to be interviewed, or did not complete the interview. Although the final number of patients interviewed is small compared to the number admitted during the study period, the actual refusal rate was 30% (180 of 591).

Measures

Physical and sexual abuse. To assess physical abuse experiences, we administered a slightly modified version of a structured interview used by Jacobson (1989; Jacobson & Richardson, 1987). Participants were asked to report on a range of interpersonal violence experiences occurring before the age of 18 and excluding fighting with other children. Participants were first asked "When you were a child, did anyone ever use physical force on you?" Those answering "yes" were asked to identify the person who used force and were then asked a series of questions about 11 specific types of force such as "Did this person ever throw something at you?" These structured interview questions for physical violence were a slightly modified version of the Physical Violence Scale of the Conflict Tactics Scales (CTS; Straus, 1979). The CTS is widely used in studies of family violence and its original form has been shown to have good reliability and validity (Straus & Gelles, 1986; Straus, Gelles, & Steinmetz, 1980). We assessed physical force for up to four assailants along with age, duration, and frequency of each experience.

To assess sexual abuse, we administered a slightly modified version of a structured interview used by Jacobson (1989; Jacobson & Richardson, 1987). The interview for sexual experiences focused on experiences occurring before the age of 18 and excluded consensual sexual experiences with children of the same age. The sexual abuse interview began with a screening question of "When you were

a child, did anyone ever touch you in a sexual way or do something sexual or something weird that made you feel uncomfortable?" We assessed 11 different types of forced sexual experiences with up to four persons, age at the time of the experience, duration, and frequency.

To improve the accuracy of participants' reports, wording of questions in both sexual and physical force interviews was behaviorally specific and neutral. The experiences were not labeled "abuse," and the person using physical or sexual force on the child was not labeled an "abuser." This is important because many abuse victims do not conceptualize their experiences as "abuse" and because there may be little consistency in the perceived meaning of the word "abuse" across individuals. Both abuse interviews asked about the occurrence of specific experiences, rather than asking for free recall of experiences. Use of specific verbal cues is recommended because it tends to improve the accuracy of reporting of events that patients may be reluctant to report (Cohen, Erikson, & Powell, 1984).

Frequency of violent and other abuse scores. Responses to the physical and sexual abuse interviews were used to calculate scores representing two types of abuse experiences: those that involve a high level of violence and those that did not. Scores for the frequency of VSA and VPA were the sum of frequencies for the most violent sexual abuse events (attempted or completed oral, vaginal, or anal penetration) and the most violent physical abuse events (being hit with an object, being kicked, bitten or hit with a fist, being burned, being beaten, or being threatened with a gun or knife). Scores for other sexual abuse (OSA) were the sum of the frequencies for unwanted experiences of being kissed or hugged in a sexual way, having one's breasts or body touched in a sexual way, being shown someone's sexual organs, having someone look at your sexual organs, having someone touch your sexual organs, being made to touch someone's sexual organs, and having someone put their mouth on your sexual organs. Scores for other physical abuse (OPA) were the sum of the frequencies for having someone throw, smash, or kick something; having someone threaten to hit you or throw something at you; having something thrown at you; being pushed, grabbed, or shoved; and being slapped or spanked hard.

It is important to note that the frequencies used in the extent scores represent frequencies of each specific experience item and not occasions on which abuse occurred. Counted in this way, a higher frequency score is assigned when multiple sexual or physical force experiences occurred on the same occasion.

Psychometric support for the reliability and validity of the physical and sexual abuse interviews was collected along with the study data. Test-retest reliability data were collected for the physical and sexual abuse interviews, but was only available for a small number of participants due to most participants' very short stays in the hospital. With a test-retest interval of 1–2 weeks, test-retest reliability for VPA was $r = .83$ ($p < .01$, $n = 11$) and for OPA was $r = .57$ (ns, $n = 11$). Low test-retest reliability for OPA was largely the result of inconsistency for a few participants in

reporting of uses of physical force such as hitting and hard spanking. Test-retest reliability for VSA was $r = .98$ ($p < .001$, $n = 12$) and for OSA was $r = .98$ ($p < .001$, $n = 12$). These findings indicate good to excellent reliability for VPA, VSA, and OSA, and questionable reliability for OPA scores. Reliability findings should be considered preliminary, however, because of the limited sample size.

The construct validity of the physical and sexual abuse interviews is supported by moderate correlations between abuse scores and other theoretically related variables (neglect, caretaker dysfunction, and social support) as shown in Table 2. In addition, violent and other physical and sexual abuse scores were moderately related to depression, and violent and other physical abuse scores were moderately related to PTSD and dissociation. Violent and OSA scores were strongly related to PTSD and dissociation. Analysis of the internal consistency of interview responses was not conducted because the measure assesses experiences that may not reflect any coherent underlying construct.

Neglect. The extent of neglect experienced during childhood was measured with a set of questions that were part of a structured interview about childhood experiences. Participants were asked about getting sick because of neglect, being sick and having no one take care of them, going without food or water for a day or more, living away from home for more than 3 months, and living in foster care. Neglect scores reflect the number of these experiences endorsed and could range from 0 to 5.

Childhood nonabuse traumas and adult traumas. Information about traumatic events other than abuse was collected as part of the Structured Interview for PTSD (SI-PTSD) described later. The number of traumatic events experienced by participants was coded as an ordinal variable rather than as a simple frequency count because data for this variable would have been lost from some participants if simple frequency counts were used. This is because some participants (largely those who experienced combat or spousal abuse) were unable to provide a frequency count. Childhood nonabuse and adult traumas were therefore coded into categories as follows: 0 = 0 traumas, 1 = 1 trauma, 2 = 2–3 traumas, 3 = 4–5 traumas, and 4 = 6 or more traumas.

Caretaker dysfunction. The extent of caretaker dysfunction was measured as part of a structured interview about childhood experiences. Participants were first asked with whom they lived as a child, who was supposed to take care of them, and who were other important caretakers. For up to five caretakers, participants were then asked whether the caretaker had a problem with drinking or alcohol abuse, had other mental problems, ever attempted suicide, or was violent toward others in the household. Caretaker dysfunction scores reflect the items endorsed for all caretakers and could range from 0 to 20.

Social support as a child. The Structured Interview for Social Support as a Child (SI-SSC) was used to assess perceived childhood social support. The measure was designed to assess subjective perceptions of social support rather

than received social support because the stress-buffering function of social support is thought to be more strongly related to perceived social support than to actual or enacted social support (Thompson, 1994). To assess the multiple functions of social support (Thompson, 1994), the SI-SSC inquires about self-esteem support, informational support, instrumental support, motivational support, and listening support. Participants were asked about whether they had received different types of social support as a child, who the support was provided by, and when it was given. For each type of social support, participants were asked to rate how much it helped on a 4-point Likert scale (ranging from 0 to 3 with labels of *not at all*, *a little*, *somewhat*, *very much*). Scores for the SI-SSC are calculated by averaging ratings for the five types of social support and can range from 0 to 3. The reliability and validity of the SI-SSC are supported by a test-retest reliability of .93 ($p < .001$, $n = 13$) and significant negative correlations with caretaker dysfunction, $r(206) = -.17$, $p < .05$; extent of VSA, $r(180) = -.24$, $p < .001$; and extent of VPA, $r(201) = -.24$, $p < .001$. As with the abuse interviews, analysis of the internal consistency of SI-SSC responses was not conducted because the measure assesses experiences that may not reflect any coherent underlying construct.

Adult socioeconomic status. Socioeconomic status (SES) was assigned using the Hollingshead's Two-Factor Index of Social Position (Hollingshead & Redlich, 1958). SES scores were based on the participant's education and the most recent occupation of either the participant or the head of his or her household (whichever resulted in a higher SES). Hollingshead Index SES scores can range from 11 to 77 with lower scores reflecting higher SES.

PTSD symptoms. The Structured Interview for Post Traumatic Stress Disorder (SI-PTSD) was used to assess and quantify the *DSM-IV* diagnostic criteria for PTSD (Davidson, Kudler, & Smith, 1990; Davidson, Smith, & Kudler, 1989). Interviewers assign participants a score on a 5-point Likert scale (ranging from 0 to 4 with labels of *not at all*, *mild*, *moderate*, *severe*, and *extremely severe*) for each of the 17 PTSD symptom criteria. The SI-PTSD has been found to have good interrater reliability, good test-retest reliability, and good concurrent validity (Davidson et al., 1989, 1990). SI-PTSD scores were available only for participants who reported one or more traumatic experiences. Some participants who reported abuse experiences did not report having had a traumatic experience and were not administered the SI-PTSD.

Dissociation. The Dissociative Experiences Scale (DES) was used to quantify dissociative symptoms. This 28-item, self-report measure inquires about experiences of amnesia, depersonalization, derealization, absorption, and imaginative involvement. Participants are asked to circle a number to show what percentage of the time each experience happens to them. Total scores on the scale are the average of the 28 items' scores and can range from 0 to 100. The DES is a widely used measure of dissociation and has strong psychometric properties (Bernstein & Putnam, 1986; Carlson & Putnam, 1993; Waller, 1995).

Depression. The depression subscale from the Symptom Checklist-90—Revised (SCL-90-R; Derogatis, 1983) was used to measure current level of depression. The SCL-90-R is a 90-item, self-report psychiatric rating scale that produces subscale scores for a variety of psychiatric symptoms. The scale has been used extensively in psychiatric research and has well-established psychometric properties (Derogatis, 1983). The depression subscale score is the average of 13 subscale item scores and can range from 0 to 4.

Procedure

After written informed consent was obtained, participants completed self-report measures. Structured interview data were then collected in private interviews conducted by clinical psychology graduate students who were trained and supervised by on-site staff (J. A. and D. R.).

Special procedures were employed to maximize the accuracy of retrospective reports. To minimize the influence of experimenter and subject expectations, participants were interviewed by a research staff member who was not known to them or involved in their treatment. In addition, a time line for life events was constructed at the beginning of each interview. A specific list of key life events was used to create a life history anchored in time. This time line was later used to locate sexual and physical force experiences in time relative to anchored life events. This method was used to increase the accuracy of the retrospective reports by decreasing distortion and telescoping of time in memory and by providing memory cues to which participants could relate events (Bradburn, Rips, & Shevell, 1987; Cohen et al., 1984).

Results

Preliminary Analyses

Examination of the distributions of the frequencies of VPA, OPA, VSA, and OSA variables showed that they were highly skewed and kurtotic. These variables were transformed with common logarithm transformations to normalize their distributions. Furthermore, examination of the raw data indicated that scores for all variables covered a wide range and that outliers did not exert undue influence on the outcomes of any statistical tests.

Descriptive Results

Of 217 participants interviewed, complete data for all predictors in the regression analyses were available for 178 participants. Data were missing for some predictor variables, most notably for VSA and OSA, because participants

Table 1. Means and Standard Deviations of Predictor and Outcome Variables

	Mean	*SD*	Skewness	Range
Family environment				
Neglect	1.1	1.4	1.38	0–5
Caretaker dysfunction	2.8	2.1	0.85	0–11
Social support as a child	1.8	1.0	−0.44	0–3
Trauma characteristics				
Violent sexual abuse	0.81	1.36	1.41	0–4.57
Violent physical abuse	1.98	1.48	−0.12	0–4.71
Nonabuse childhood traumas	0.12	0.58	5.77	0–4
Other abuse experiences				
Other sexual abuse	1.31	1.63	0.83	0–4.96
Other physical abuse	2.61	1.52	−0.56	0–5.31
Adult traumas	1.23	1.30	0.77	0–4
Outcome variables				
PTSD	27.1	16.3	0.16	0–60
Dissociation	28.0	21.5	0.80	0–88
Depression	2.2	1.0	0.40	0–4

Note. $N = 178$, except for adult traumas ($n = 170$) and PTSD ($n = 136$).

answered "don't know" when asked about particular sexual abuse experiences or were unable to estimate the frequency of particular experiences. Scores for predictor and outcome variables were generally higher for the participants who had missing data. For consistency, descriptive and correlational findings are presented for the 178 participants who were included in the multiple regression analyses. Of these participants, 92 (52%) were women and 86 (48%) were men. The average age of participants was 38 ($SD = 4.9$). In terms of race, 79.5% were White, 18.8% Black, and 1.7% of another race. Marital status of participants was varied, with 35% married, 34% single, 17% divorced, 12% separated, and 1% widowed. The mean SES was 42 ($SD = 17.2$). The means and standard deviations for all predictor and outcome variables are presented in Table 1. PTSD scores were not available for participants who reported no traumas and were therefore not administered the SI-PTSD. Values for abuse frequency scores are common log transformations of frequencies of specific abuse events (not abuse occasions). Also, although we made considerable efforts to maximize the accuracy of participants' reports of their past experiences of sexual or physical force, these reports are likely to contain some degree of error due to overreporting, underreporting, and distorted reports of past experiences. Therefore, as suggested by Henry and colleagues (Henry, Moffitt, Caspi, Langley, & Silva, 1994), retrospective reports are used in this study to test hypotheses about the relative standing of individuals in a distribution, but are not considered precise reports of event frequency.

Table 2 shows zero-order correlations among predictor and outcome variables. Only correlations reaching statistical significance levels of .05 or less are shown.

Table 2. Correlations Among Predictors and Outcomes

	1	2	3	4	5	6	7	8	9
1. Neglect		.36***		.29***	.29***		.30***	.35***	
2. Caretaker dysfunction				.43***	.38***	.23**	.38***	.44***	
3. Social support as a child				−.24***	−.24***		−.28***	−.20**	
4. Violent sexual abuse					.42***	.15	.88***	.37***	
5. Violent physical abuse							.37***	.80***	
6. Other child traumas									−.16
7. Other sexual abuse								.35***	
8. Other physical abuse									
9. Adult traumas									
10. PTSD	.28***	.39***	−.33***	.58***	.44***		.56***	.34***	
11. Dissociation	.29***	.28***	−.23**	.52***	.35***		.49***	.28***	
12. Depression		.18**	−.23**	.31***	.20**	.16	.35***	.18**	

Note. $N = 178$, except for PTSD correlations ($n = 136$). All correlations shown have p-values of .05 or less. Nonsignificant correlations are not reported.
**$p < .01$. ***$p < .001$.

Regression Analyses

Table 3 shows the results of hierarchical multiple regression analyses to predict the three outcome variables, including changes in R^2 for each set of predictor variables, and β values and changes in R^2 that are uniquely associated with predictor variables at each step of the analysis. Variables were entered into each regression analysis as sets in three steps based on a comprehensive conceptual framework for the long-term effects of trauma (Carlson & Dalenberg, 2000) and in an order reflecting their presumed chronological occurrence. Given that other child traumas and adult traumas were not strongly related to other predictor variables and that initial multiple regression analyses including them showed that they did not significantly contribute to prediction of any of the outcome variables, these predictors were not included in the final regression analyses.

As an exploratory analysis of possible interaction effects, two multiple regression analyses were conducted (to predict PTSD and to predict dissociation) with seven interaction terms added after the seven predictors. The two violent abuse variables (sexual and physical) were crossed with the three family environment variables (neglect, caretaker dysfunction, social support) and with each other. From these, three interactions emerged as statistically significant. Two of these appear to be statistical artifacts resulting from a few extreme scores. For the interaction between VSA and social support, those reporting any VSA events were more reactive to social support than those with no VSA. Among those reporting VSA experiences, those reporting more social support were less dissociative, $r(62) = -.27$, $p < .05$, whereas among those reporting no VSA, social support and dissociation were unrelated, $r(116) = -.08$, *ns*.

Table 3. Hierarchical Regressions Predicting PTSD, Dissociation, and Depression Symptoms

	PTSD			Dissociation			Depression		
	ΔR^2	β	unique ΔR^2	ΔR^2	β	unique ΔR^2	ΔR^2	β	unique ΔR^2
Step 1: Family environment	.25***			.16***			.08**		
Neglect		.13			.22	.04**		.04	
Caretaken dysfunction		.31	.09***		.18	.03*		.14	
Social support as a child		−.27	.07***		−.20	.04**		−.21	.04**
Step 2: Traumatic abuse	.17***			.16***			.04*		
Neglect		.05			.14	.015*		.003	
Caretaker dysfunction		.10			−.004			.05	
Social support as a child		−.15	.02		−.10			−.15	.02*
Violent sexual abuse		.40	.11***		.41	.12***		.23	.04**
Violent physical abuse		.17	.02*		.11			.04	
Step 3: Other abuse experiences	.01			.005			.03		
Neglect		.07			.14	.015*		−.02	
Caretaker dysfunction		.11			.01			.05	
Social support as a child		−.13			−.09			−.13	
Violent sexual abuse		.29	.02*		.32	.02*		−.03	
Violent physical abuse		.28	.03**		.17			.04	
Other sexual abuse		.14			.11			.30	.02*
Other physical abuse		−.15			−.08			.01	
Total R^2		.42***		.32***			.15***		

Note. For the equation predicting PTSD including all predictors, $F(7, 128) = 13.48$, $p < .001$. For the equation predicting dissociation including all predictors, $F(7, 170) = 11.4$, $p < .001$. For the equation predicting depression including all predictors, $F(7, 170) = 4.14$, $p < .001$.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Discussion

Overall, the results of this study supported the model tested in that sets of family environment, violent abuse, and other abuse variables collectively predicted significant proportions of adult symptoms of PTSD, dissociation, and depression. The amount of variance in the outcomes accounted for by the predictors ranged from 15% (for depression) to 42% (for PTSD). In addition, violent abuse predicted significant proportions of the variance in the symptoms beyond the contribution of family environment variables, accounting for the most additional variance in PTSD symptoms (17%) and dissociation (16%). These findings are consistent with the hypothesis that aspects of social context, severity of trauma, and other life events all influence the long-term effects of childhood abuse. The findings also support the hypothesis that violent abuse has distinctive effects beyond those associated with family environment variables.

Although no prior studies have specifically examined the differential effects of violent abuse and other abuse, the finding that family environment, abuse, and other individual characteristics accounted for 42% of the variance in adult PTSD symptoms is consistent with results from other studies of the long-term effects of early child abuse. Various studies of adults with CSA or CPA histories or both have found that abuse and individual characteristics accounted for between 27 and 45% of the variance in adult PTSD symptoms (Epstein, Saunders, & Kilpatrick, 1997; Rodriguez et al., 1996, 1997). Differences in the strength of prediction across studies are explained in part by differences in the populations studied and in how the predictors were operationalized across studies. What is remarkable is the consistent finding across studies that a substantial proportion of variance in adult PTSD symptoms can be predicted by environmental, abuse-related, and individual characteristics. Collectively, the findings of these studies lend support to theories that hypothesize a meaningful long-term impact of childhood abuse.

In terms of the capacity of particular abuse variables to predict particular symptoms, significant β values in Table 3 show that VSA and VPA were unique predictors of PTSD symptoms, and VSA and neglect were unique predictors of dissociation symptoms. The finding that PTSD and dissociation are uniquely associated with violent abuse is consistent with a considerable body of research showing elevations in these symptoms among those exposed to trauma (Carlson, 1997; Shalev, 1996) and those who experienced childhood abuse (Carlson et al., 1997; Neumann et al., 1996). Depression, on the other hand, did not emerge as a symptom that is very specific to violent abuse. A relatively small proportion of the variance in depression (4%) was associated with violent abuse and only one variable (OSA) was uniquely associated with depression once all of the predictor variables had been entered into the equation. Overall, these findings are consistent with our theoretical framework, which proposes that violent abuse experiences are most strongly associated with elevations in PTSD and dissociation

and that depression is best conceptualized as a syndrome that is not a direct result of trauma exposure, but is secondary to core traumatic responses or associated with other aspects of a traumatic situation (Carlson & Dalenberg, 2000).

The finding that VSA and VPA uniquely predict variance in posttruamatic symptoms whereas other abuse experiences do not also supports the hypothesis that childhood abuse events that are likely to produce overwhelming fear may have long-term effects that are distinct from the effects of other less violent abuse experiences. Future studies of the long-term effects of abuse experiences may be more informative if researchers operationalize abuse variables in a way that permits analysis of the differential effects of violent and other abuse experiences.

Two predictor variables that did not relate strongly to the posttraumatic symptoms studied included other childhood traumas and adult traumas (see Table 2). Although this finding may seem surprising at first glance, we believe that it reflects the inadequacy of frequency counts of different types of trauma to measure the severity of trauma. Because exposure to one extremely severe traumatic stressor may be more distressing than exposure to a larger number of less severe traumatic stressors, variables that reflect frequency of traumatic experiences with varying levels of severity may not correlate well with posttraumatic responses.

In terms of the causal relationships between predictor and outcome variables, the relative contributions of the sets of variables to explaining symptoms is not possible to determine from these analyses. Although family environment variables were entered into the regressions preceding other variables because they were presumed to precede abuse in time or to co-occur, this does not mean that family environment can be presumed to have a greater causal role than predictors entered later. Examination of Table 2 shows that there was considerable multicollinearity among the predictors with absolute r values ranging from .15 to .88. When there is such multicollinearity among predictors, variables entered earlier into hierarchical multiple regression analyses will get "credit" for variance in the outcome that is shared among predictor variables (Licht, 1995). Variables entered later into an analysis may actually have a causal role, even if they do not show a statistically significant unique contribution in the regression analysis. In fact, using path analytic procedures, it is often shown that variables earlier in the causal chain lose their unique contribution in the final simultaneous regression. Therefore, from multiple regression analyses, it is not possible to determine which, if any, of the predictor variables is responsible for shared variance. In our study, for example, variance in symptoms accounted for by family environment variables may actually be causally related to violent abuse if abuse and family variables tend to co-occur. And judging from the correlations among predictors in this study, these predictors do seem, to some extent, to co-occur phenomenologically.

Although some authors have hypothesized that preexisting psychopathology or family variables may account for elevated levels of posttraumatic symptoms in those who experienced childhood sexual and physical abuse (Nash, Hulsey, Sexton,

Harralson, & Lambert, 1993), the support for this notion is based on ANCOVA analyses in which the effects of family variables on PTSD were examined while abuse was "controlled for." Briere and Elliott (1993) have provided a convincing methodological critique of such studies, and Briere (1988) has pointed out that the influence of family variables with abuse "removed" may have no "real world" meaning. This is because, because family variables presumably occur before (or at the same time as) abuse, once abuse does occur, the effect of family variables in those participants cannot be understood independently of abuse because, at that point in time, the family variables have *already* had an influence on the individual. On the other hand, it is possible to examine the effect of family variables *first* and then see if *later* abuse accounts for any additional variance in symptoms. In fact, a recent prospective study using just this type of analysis found that physical and sexual assault experiences were associated with posttraumatic stress symptoms in children between the ages of 10 and 16 even after controlling for prior psychopathology and parent–child relationships (Boney-McCoy & Finkelhor, 1996). Our finding of unique contributions of violent abuse to the prediction of PTSD symptoms beyond those of family environment variables are consistent with the findings of this prospective study.

The finding of an interaction between perceived childhood social support and VSA in predicting dissociation indicates that perceived social support moderates the relationship between VSA and dissociation such that perceived social support and adult dissociation are more strongly associated among those who experience VSA than among those who do not. A moderating effect of social support might operate directly, indirectly, or in both ways. Operating directly, social support may reduce a person's need or tendency to dissociate by providing opportunities to discuss and process the VSA events. Social support might also affect an individual's resilience or hardiness, thus indirectly affecting responses to VSA. Future studies might examine these relationships to determine whether this interaction is replicated and to investigate alternative mechanisms for the effect.

Limitations of this study include sample selectivity and use of retrospective reports. In regard to sample selectivity, it is possible that the sample of participants included in the study is not truly representative of psychiatric inpatients because the participants studied may differ from those patients who were unwilling or unavailable to participate in the study. Although this concern constitutes reason for caution in generalization of the study's findings, the fact that participants' responses for all predictors and outcomes were distributed across the entire range of possible responses indicates that the sample did include patients with a wide spectrum of abuse experiences and of current psychopathology.

Use of retrospective reports in this study is a limitation because those reports are subject to error from underreporting, overreporting, and distortion in reports. First, it is important to consider whether reports of psychiatric patients, in general, are less accurate than those of other participants. One group of patients that might be

expected to overreport abuse experiences would be psychotic patients. If psychotic patients were misreporting, one would expect their reports to reflect their psychotic thinking processes and show disturbances in thought. But this does not seem to be the case. A study by Goodwin and colleagues (Goodwin, Attias, McCarty, Chandler, & Romanik, 1988) examined abuse reports of psychotic patients and found no substantial differences in looseness or bizarreness in the abuse accounts. Similarly, Carmen and colleagues (Carmen, Rieker, & Mills, 1984) found that the types of abuse accounts that are elicited from psychiatric inpatients do not differ significantly from those of adult victims in the general population.

Although psychiatric patients' abuse reports may not differ greatly from those of other patients, there is evidence that the precise levels of abuse reported by patients may not always be accurate. Widom and Morris (1997) and Widom and Shepard (1996) found substantial levels of underreporting of sexual and physical abuse experiences when abuse reports were compared to official court records. Although methods incorporated in this study to help control error from these sources may have increased the accuracy of participants' abuse reports, they are still likely to include some degree of error. In accordance with recommendations of researchers studying the accuracy of retrospective reports (Henry et al., 1994; Widom & Shepard, 1996), the retrospective reports of abuse in this study were used only to test hypotheses about the relative standing of individuals with a wide distribution of abuse severity and were not assumed to be precise reports of abuse frequency. Furthermore, though studies of this nature can be vulnerable to a type of retrospective bias wherein severely disturbed patients make reports that are biased in the direction of more negative past events, the distribution of participants' scores on the Global Severity Index of the SCL-90-R indicates that the findings of this study are not likely the result of this type of retrospective bias alone. If such bias were largely responsible for the findings, the data points would be concentrated at the high and low ends of each variable range. Instead, some participants with very high global psychopathology reported no VPA and patients with low levels of global psychopathology reported a wide range of VPA. In addition, if more severely disturbed patients were making biased reports, then the relationship between predictors and depression should have been as great or greater than the relationships between predictors and PTSD or dissociation. On the contrary, relationships between predictors and depression were considerably weaker than relationships between predictors and PTSD and dissociation.

Despite the drawbacks of using retrospective reports in studies of the long-term effects of abuse, collection of retrospective data is one of the few methods possible to study the effects of abuse on adults who did not report their abuse when it occurred. Because research indicates that a majority of those abused as children fall into this category (Hartman, Finn, & Leon, 1987), studies using retrospective reports may be an important source of information about the long-term effects of abuse for some individuals.

Although studies using more rigorous methods of assessing abuse clearly yield more accurate estimates of abuse, they may be providing information about a different population. Studies including reports of abuse corroborated by documentation represent individuals who did report their abuse. Similarly, prospective studies tend to include only those who report abuse because they generally sample participants with confirmed cases of abuse. As Widom (1989) points out, it is not possible to generalize results from samples including only those who made official reports to those who did not report abuse. This is because those who do report abuse and those who do not are likely to be different from one another in a number of respects. Most important, those who report abuse are far more likely to experience intervention by family or authorities, to experience social support, and to have abuse end because of the report. Arguably, those who report abuse are also more likely to be those who are least harmed by the experiences because they are more likely to be in environments that support reporting, more likely to have emotional resources sufficient to risk reporting and not getting support, and less likely to be fearful of retaliation for reporting. In one study that examined both disclosure of abuse and maternal support for disclosure, Lawson and Chaffin (1992) found that children with sexually transmitted diseases who were asked about their sexual experiences and who were accompanied by a mother supportive of disclosure had a disclosure rate almost four times as high as that of children accompanied by unsupportive mothers. For these reasons, it is imperative that those who report undocumented abuse be studied to better understand the long-term psychological consequences of violent child abuse, even if this means compromising methodological rigor by using retrospective reports with undetermined validity.

Clinically, the findings of this study may be useful in identifying those at long-term risk for posttraumatic symptoms and in providing interventions to minimize the impact of abuse experiences. For example, children who experience frequent violent sexual or physical abuse seem to be at risk for developing PTSD and dissociation symptoms as adults. Preventive interventions aimed at increasing social support to children and at reducing exposure to violent abuse, caretaker dysfunction, and neglect may reduce risk for long-term posttraumatic symptoms.

Because PTSD and dissociation were both strongly associated with early violent abuse, routine screening for these symptoms among adult psychiatric patients may be useful to identify those with undetected early trauma histories. Screening psychiatric patients for violent abuse experiences may also allow earlier identification of those needing treatment of posttraumatic responses. In addition, treatment of clients with posttraumatic symptoms may be more effective if therapists are attentive to family environment, violent abuse, and other abuse variables that tend to be strongly related to severity of symptoms. Because these early experiences seem to contribute to the variance in symptomatology, understanding their effects on clients may play a valuable role in resolving the psychological difficulties created by the experiences and in reducing symptomatology.

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